

WHAT IS CLAIMED IS:

1. A navigation device comprising:
a processor;
a memory in communication with the processor; and
a data structure residing in the memory, wherein the processor dynamically inserts selected available adjacent locations from a map into the data structure which are obtained from traversing from a starting location in the direction of an ending location, the data structure maintains a least cost location as its first index location during the inserts, the processor generates a route path by repetitively extracting the first index location from the data structure, the data structure updates the first index location during each extraction.
2. The navigation device of claim 1 further comprising a display in communication with the processor for presenting the route path and the map on the display.
3. The navigation device of claim 2 wherein the navigation device is a personal digital assistant.
4. The navigation device of claim 1 further comprising a Global Positioning Satellite receiver for determining the starting location within the map based on a current physical position of the device which is obtained from the receiver.

5. The navigation device of claim 4 wherein the receiver is used to dynamically update moving positions of the device within the route path and the map as the device is detected moving.

6. The navigation device of claim 1 further comprising an audio device in communication with the processor for audibly communicating portions of the route path as physical locations of the device are detected traversing the route path.

7. The navigation device of claim 1 further comprising a second data structure residing in the memory that houses the repetitively extracted first index locations, wherein the second data structure represents the route path, and the processor dynamically accesses the second data structure for communicating portions of the route path when needed.

8. A navigation system comprising:
a personal digital assistant (PDA);
a Global Positioning Satellite (GPS) receiver integrated with the PDA; and
a navigation application in communication with the PDA and the receiver;
wherein the navigation application dynamically generates a route path from a map in response to receiving a destination and resolving a starting position based on a current physical position of the PDA obtained from the receiver, the navigation application generates the route path by traversing the map from the starting position to the destination and inserting available adjacent locations from the map into a data structure, the data

structure maintains its first index location as a least cost location, the navigation application generates the route path by repetitively extracting the first index location from the data structure upon completing the traversing.

9. The navigation system of claim 8, wherein the navigation application communicates wirelessly with the PDA and processes from a location that is external to the PDA.

10. The navigation system of claim 8, wherein the navigation application processes on a processor of the PDA.

11. The navigation system of claim 8 wherein the navigation application presents the route path, moving positions of the PDA using the receiver, and the map on a display of the PDA.

12. The navigation system of claim 8 wherein the navigation application communicates portions of the route path to an audible device of the PDA as moving positions of the PDA are detected using the receiver.

13. The navigation system of claim 8 wherein the map is cartographic data including thoroughfare identifications.

14. The navigation system of claim 8 wherein the map is loaded to memory of the PDA from removable computer-readable media.
15. A computer-readable medium encoded with functional data to produce an optimal route, comprising:
- a beginning node;
 - a destination node; and
 - one or more intermediate nodes each having a cost;
- wherein the medium is organized with the beginning node, the destination node and the one or more intermediate nodes, and a first index location of the medium maintains a least cost node as the one or more intermediate nodes are added to the medium and as a select number of the one or more intermediate nodes are removed from the medium, and wherein the beginning node is initially located at the first index location, and once the destination node is removed from the medium, removed nodes represent an optimal route from the beginning node to the destination node.
16. The computer-readable medium of claim 15, wherein the medium is a treap data structure.
17. The computer-readable medium of claim 15, wherein the medium is interfaced to a personal digital assistant capable of serving as a navigation device and having an integrated Global Positioning Satellite receiver.

18. The computer-readable medium of claim 15, wherein the medium is implemented in memory of a navigation device.

19. The computer-readable medium of claim 15, wherein the medium is external to a navigation device and accessible to the navigation device over a network.

20. The computer-readable medium of claim 15, wherein the nodes are inserted into the medium by a navigation application and are associated with a map representing cartographic data.